

Indirect Measurement Lab

Name _____

An investigation using Shadows and Mirrors

Group members: _____

Directions: Complete each problem as indicated at its station.

For each problem:

1. **Draw a picture**, including the triangles you are using to find your answers.
2. **Make a similarity statement**, telling which triangles are similar to each other.
3. Label all parts with correct measurements. When measuring, **make all measurements in the units used in the problem**
4. **Write an equation** showing the proper proportions.
5. Solve the problem.
6. **Write all answers in complete sentences. Express your answers in feet/inches or meters/centimeters.**

*** You must choose two objects to measure indoors (i.e. wall) and three outdoors (i.e. light pole, tree).

Use the following variables at the Mirror Measurement stations:

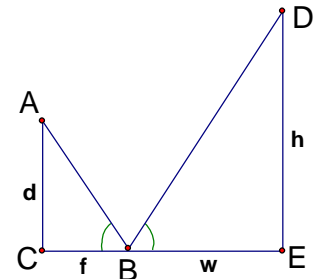
B is the location of the edge of the mirror.

d = distance from the floor to eye level - keep the tape measure perpendicular to the floor.

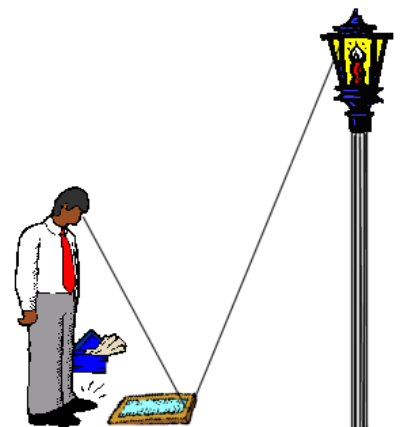
f = distance from your feet to the reflection of the object in the mirror along the floor.

w = distance from the reflection in the mirror to the wall along the wall

h = the height from the floor to the object - the distance you are finding.



Station 1: Marcus is looking down into a mirror (see illustration) and has moved back to see the top of the lamp post at the top edge of the mirror. He knows that his eyes are 6' off of the ground and he is 1.5' from that point on the mirror. The distance from that point on the mirror to the lamp post is $37\frac{1}{2}$ ". How tall is the lamp post? (Express your answer in feet and inches.)



Station 2: Inside with mirrors: Measure the height of the _____
(measure using inches)

Station 3: Inside with mirrors: Find the height of the _____
(measure using cm)

Station 4:

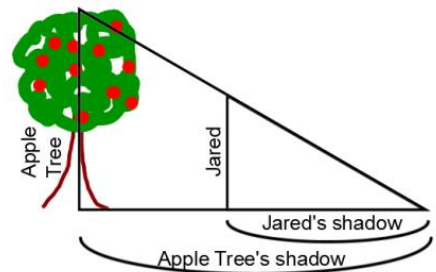


One day the shadow of the small 3' 4" tree cast a shadow of 5 feet. The palm tree cast a shadow of 25.5 feet. How tall is the palm tree? (use inches/feet)

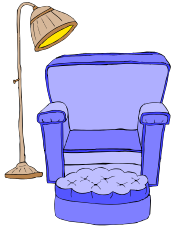
Station 5: Outside with shadows: Find the height of the _____
(measure using cm)

Station 6: Outside with shadows: Measure the height of the _____
(measure using inches)

Station 7: Jared is standing 5' in front of a tree and he is 6' tall. His shadow is 4 foot long and the shadow of the apple tree ends 4 in front of Jared too. How tall is the apple tree?
(use inches/feet)



Station 8: The light is sitting on the floor behind the chair at a distance of $1\frac{1}{2}$ feet from the bottom of the lamp to the back of the chair. The lamp is shining on the chair and casts a shadow 4 foot in front of the chair and the light source is 66 inches off the floor over the bottom of the lamp. How tall is the back of the chair? (use inches/feet)



Station 9

If the sign is 5' 10" tall and is 1' 5" from the lamp post which is 8' 8" tall, how long is the sign's shadow? (use inches/feet)

